

11. (Amended) A process for production of a sintered oxide ceramic of composition $Ce_xM_yD_zO_{2-a}$ with dense structure without open porosity or with a predetermined porosity comprising the steps of:

using a first doping element M selected from the group consisting of rare earths, but wherein $M \neq Ce$, alkali metals, earth alkali metals, and Ga;

using an educt with a second doping element D of at least one metal, but wherein $D \neq M$, selected from the group consisting of Cu, Co, Fe, Ni, and Mn wherein second doping element D is of submicron particle size or is a salt solution; and

sintering the educts at a temperature between 750-1200°C until a density of at least around 98% of the theoretically possible density is reached to form said oxide ceramic having a grain size no greater than 0.5 μm and wherein the mol fractions used range from $0.5 \leq x \leq 1$ for Ce, $0 \leq y \leq 0.5$ for first doping element M, and $0 < z \leq 0.05$ for second doping element D.

21. (Amended) The process according to claim 11 wherein sintering is prematurely interrupted leading to a porous structure with a specified lower density around 98%.